

Atty. Docket No. PIA31217  
Serial No: 10/764,637

Remarks

Applicant and his representatives wish to thank Examiner Lindsay for the thorough examination of the present application, the detailed explanations in the Office Action dated September 27, 2005, and the indication that Claims 6 and 7 (if rewritten in independent form) are allowable.

The present invention relates to a method for forming a semiconductor device isolating barrier. The method (as set forth in amended Claim 1, above) generally includes the steps of (a) forming a pad oxide layer and a nitride layer on a semiconductor substrate, (b) forming a trench region by etching the pad oxide layer and the nitride layer, (c) forming spacers at sidewalls of the etched pad oxide layer and the etched nitride layer, (d) forming a trench by etching the semiconductor substrate using the spacers and the etched nitride layer as a mask, and (e) after forming a liner oxide layer and a trench oxide layer filling the trench, forming the device isolating barrier by flattening the liner oxide layer and the trench oxide layer to expose the etched nitride layer.

The references cited against the originally-filed claims (Gonzalez et al., U.S. Patent No. 6,097,076, and Park, U.S. Patent No. 6,790,754) neither disclose nor suggest forming spacers at sidewalls of both the etched pad oxide layer and the etched nitride layer. Furthermore, Park is not prior art to this application. Consequently, the present claims are patentable over the cited references.

The Rejection of Claims 1 and 2 under 35 U.S.C. § 102(b)

The rejection of claims 1 and 2 under 35 U.S.C. § 102(b) as being anticipated by Gonzalez et al. (U.S. Patent No. 6,097,076) has been carefully considered but is respectfully traversed.

Applicant wishes to direct the Examiner's attention to MPEP § 2131 which states that to anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814

Atty. Docket No. PIA31217  
Serial No: 10/764,637

F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimum verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1 566 (Fed. Cir. 1990).

With respect to amended Claim 1, the method includes the steps of forming a trench region by etching the pad oxide layer and the nitride layer and forming spacers at sidewalls of the etched pad oxide layer and the etched nitride layer. Thus, when forming a trench region, both the pad oxide layer and the nitride layer are patterned and etched. Therefore, the sidewalls of the pad oxide layer and the nitride layer are exposed, and spacers can be formed thereon. Accordingly, the sidewalls of both the pad oxide layer and the nitride layer are covered by the spacers. Support for the amendment may be found in FIGS. 2C and 2D of the present application, where spacer 108a covers not only a sidewall of nitride layer 104a but also a sidewall of a pad oxide layer 102a.

However, according to Gonzalez, a spacer 28 does not cover a sidewall of a pad oxide layer (see, e.g., FIGS. 5A-7B of Gonzales). A nitride layer 16 is patterned and etched with a mask 20, but pad oxide 14 is not. In other words, the pad oxide 14 is not patterned or etched when nitride layer 16 is patterned and etched. Then, an insulation film 26 is formed thereon. Following deposition of the insulation film 26, a spacer etch and an isolation trench etch are carried out, thereby forming a spacer 28 seen in FIG. 5A. As shown in FIG. 5A, the spacer 28 does not cover a sidewall of the pad oxide 14. Therefore, Gonzalez does not teach or suggest the steps for forming the trench region and forming the spacer on the sidewalls of both the nitride layer and the pad oxide layer. Accordingly, the rejection of independent Claim 1 and dependent Claim 2 should be withdrawn.

With regard to Claim 2, the thickness of the nitride layer ranges from 500 to 1000 Å. Gonzalez is silent with respect to the thickness of the nitride layer. Thus, Gonzales does not teach or suggest all of the limitations of Claim 2. Therefore, Claim 2 is independently patentable over Gonzales, and the rejection should be withdrawn.

Atty. Docket No. PLA31217  
Serial No: 10/764,637

The Rejection of Claims 3-5 and 8-10 under 35 U.S.C. § 103(a)

The rejection of claims 3-5 and 8-10 under 35 U.S.C. § 103(a) as being unpatentable over Gonzalez et al. (U.S. Patent No. 6,097,076) in view of Park (U.S. Patent No. 6,790,754) has been carefully considered but is respectfully traversed.

As with Claim 1, Claim 3 includes the steps of forming a trench region by etching the pad oxide layer and the first nitride layer and forming spacers at sidewalls of the etched pad oxide layer and the etched first nitride layer. Neither Gonzalez nor Park discloses or suggests the steps for forming the trench region and forming the spacers on the sidewalls of both the etched pad oxide layer and the etched first nitride layer. Thus, the combination of Gonzales and Park do not teach or suggest all of the limitations of the amended Claim 3. Moreover, it is noted that Park is not prior art to the present application. The U.S. filing date of Park is after the earliest priority date of the present application (February 4, 2003). Therefore, the obviousness rejection of Claims 3-5 and 8-10 in view of Park should be withdrawn.

Korean application no. 10-2003-0007017, to which the present application claims priority, was filed in the Korean Intellectual Property Office on February 4, 2003. A certified copy of Korean application no. 10-2003-0007017 was filed with the present application on January 26, 2004, and Applicants' claim to the priority date of February 4, 2003 has been acknowledged in the present application (see the attached printout from the "Foreign Priority" tab in the USPTO PAIR website [<https://sportal.uspto.gov/secure/myportal...>] for the present application no. 10/764,637; a brief review of the drawings for Korean application no. 10-2003-0007017 and those of the present application show substantial similarities).

A certified translation of the priority document, Korean Application No. 10-2003-0007017 filed February 4, 2003, is being concurrently submitted to perfect the claim to priority in the present application.

Atty. Docket No. PIA31217  
Serial No: 10/764,637

New Claims 11 and 12

Support for new Claim 11 may be found on page 4, paragraphs [0016]-[0017] of the original application. Support for new Claim 12 may be found on pages 4-5, paragraphs [0017]-[0018], and in FIGS. 2B and 2C of the original application. Therefore, no new matter has been introduced.

Conclusions

In view of the above amendments and remarks, all bases for objection and rejection are believed to be overcome, and the application is believed to be in condition for allowance. Early notice to that effect is earnestly requested.

If it is deemed helpful or beneficial to the efficient prosecution of the present application, the Examiner is invited to contact Applicant's undersigned representative by telephone.

Respectfully submitted,



Andrew D. Fortney, Ph.D.  
Reg. No. 34,600

Alec B. Plumb  
Reg. No. 56,433  
THE LAW OFFICES OF ANDREW D. FORTNEY, PH.D., P.C.

7257 N. Maple Avenue, Suite 107  
Fresno, California 93720  
(559) 299 - 0128